Peter Xiques of Science Applications International Corporation (SAIC) spins a model of the atom during a teaching demonstration showcased at the 2009 INL Physics Teachers Workshop.

Physics teachers explore nuclear energy at INL workshop

by Jo Seely, *INL Nuclear Science & Technology communications intern*

Math and science teachers from throughout the United States visited Idaho Falls for a week in July for the 2009 National Physics Teachers Workshop presented by Idaho National Laboratory.

Physics teachers from around the nation spent one day at different INL facilities, including historic EBR-I.

The annual event sponsored 38 teachers from 30 states for a week of educational information related to nuclear energy. The workshop is designed to provide teachers with the opportunity to increase their knowledge of nuclear energy, meet and learn from nuclear researchers, tour facilities, and interact with their peers in math and science.

Saying they came from throughout the United States is an understatement, considering this year's delegation came from the far corners of the country, one driving all the way from Maine.

"I didn't quite know what to expect," said Jon Swan, a chemistry teacher from Lewiston, Maine. "I knew I'd learn more about nuclear, but it's at a much higher level than I expected."

Swan drove across the country visiting relatives, and dropping off a kayak in Michigan for a trip to Lake Superior on his way back east. Swan teaches a two-week unit on nuclear science in each of his chemistry classes. He said he's tried to get the other three science teachers to also include the subject. One day of the workshop was spent doing lab experiments for all levels of science classrooms. Swan and a few other participants acted as resources for other teachers when using electronic radiation monitors and data collection tools.

Phillip Finck, associate lab director for Nuclear Science and Technology, gave the physics teacher's an overview of the different nuclear energy initiatives at INL.

"The experience has been invaluable," said Leigh Rath, a high school physics and chemistry teacher from Georgia, who had worked with Swan and others on the different experiments. "I have learned so much here -- many things I have been curious about, but more importantly, many things that I can take back to my physics and chemistry classrooms."

The communication and sharing of curricula and ideas has been an integral part of the workshop's continued success. This year, the discussion touched on many facets of energy as a variety of experts from the nuclear field presented to the group. INL presenters included Phillip Finck, associate lab director for Nuclear Science and Technology, and Kathryn McCarthy, deputy associate lab director for Nuclear Science and Technology, among others. Steve Shropshire, an associate physics professor at Idaho State University, and John Gutteridge, a nuclear education program manager at the Nuclear Regulatory Commission, also presented information. Speakers also represented AREVA, the American Nuclear Society and EnergySolutions.

"Knowledge of all forms of energy—nuclear energy, renewable energy, as well as traditional forms of hydrocarbons—and how they can work together is very important," said Kevin Young, an INL electrical engineer and a presenter at the workshop.

Young spoke on the importance of a science and engineering presence in all levels of education. This focus could be seen in many of the presentations and became an essential connection between the technical information and the classroom.

Rath said she viewed a better understanding of nuclear energy as the opportunity to become a better teacher. Rath said she not only became more knowledgeable about all things nuclear but now has a well-rounded understanding of energy issues.

Gary Seifert, an INL scientist, discussed alternative and renewable energy sources such as wind, solar, biomass and geothermal. He described a wind turbine and solar power system constructed at

a nearby high school, noting that the location may not be the most economical. "But with three hundred or so kids going through their science classes each year, and even more logging into the live school energy Web sites, I see it as a great return on investment," he said.

Such exposure to energy issues creates more knowledgeable individuals, Seifert said. For educators, this exposure can become exponential as they share their experiences with their students.

The teachers spent one day touring INL facilities. They visited Experimental Breeder Reactor-I, the Materials and Fuels Complex and the Advanced Test Reactor. The ATR was a favorite for Swan. "After all," he said, "we came to see the reactors."

Physics teachers learned about different opportunities for students and educators at Idaho State University from Steve Shropshire, associate physics professor.

Away from the desert, Swan said his favorite part of the week was the presentation on the Next Generation Nuclear Plant (NGNP) given by David Petti, an INL fellow and the NGNP lead. Rath agreed.

"It was extremely fascinating," said Rath, who took interest in the helium coolant used in the reactors. "I would have never thought they'd use helium."

At the end of the week, the binder of curricula, data collection tools and INL gear was boxed up and shipped to the teachers' classrooms, but it is the experience and knowledge gained that will have the real effect in schools throughout the country.

"It's important to help educators understand these real-world examples of science and engineering so they can take what they learn back to their classrooms and share it with their students," said Young. "That's one of the best ways we at INL can help educators."

Teachers share workshop experiences

by Brett Stone, *INL Nuclear Science & Technology communications intern*

Clicking noises from Geiger counters filled in the brief moments of quiet between bursts of conversation as high school physics and science teachers helped each other check their readings. Using Geiger counters and other equipment they received from Idaho National Laboratory, teachers practiced performing experiments to teach their classes about nuclear science and radiation using sources such as lantern mantles and bananas.

Kevin Young, an INL electrical engineer, spoke with the educators about methods to get more students interested in science and engineering.

"If I was to quit teaching and to have a second career, I would become a nuclear engineer," said DaNel Huggins, a high school and middle school physics teacher from Kuna, Idaho. Huggins has attended the workshop since it began five years ago. She now attends to mentor other teachers by showing them how to use their new equipment and perform experiments they can use with their classes.

Like most of the teachers, Huggins said she didn't know a lot about nuclear science when she first attended. But, by the end of the week, the teachers leave, "feeling confident that they can teach the youth about nuclear physics," Huggins said. "I think the overwhelming feedback from the teachers as they leave is that now they feel like they can teach nuclear physics and answer questions about it."

The potential for stimulating sincere interest in science and technology among students is real. In the coming school year alone, more than 3,000 students could be affected by the conference. That could lead to more results similar to what teachers like Huggins have already seen. Several students from her classes have become interested enough in nuclear science to attend Idaho State University's summer program. And, some of those same students are now studying nuclear engineering at the university level.

"Some of them are going to be the engineers of tomorrow," said Mike Hurwitz, a physics teacher at San Francisco's Lick-Wilmerding High School. "But even those that aren't, are going to be the voters and the decision-makers and they need accurate information, not media scare and stereotype."

Hurwitz didn't want to wait till fall to share the information, either. While speaking by phone to one of his more promising students during the week, he said, "Hey, be sure to include nuclear on your list of things to think about."

Teachers enjoyed a variety of presentations, such as "Everything You Didn't Know about Nuclear Energy" presented by Harold McFarlane, past American Nuclear Society president and INL deputy associate director for Nuclear Science & Technology. Phillip Finck, associate lab director for Nuclear Science & Technology, spoke on work taking place in the nuclear field.

Dave Lapp, who teaches physics at Tamalpais High School in Mill Valley, Calif., said the workshop will make class demonstrations easier and also help him encourage his students to take part in the national discussion on energy. "I'm going to be able to provide them with some really objective understanding of the nuclear power industry."

When asked if he would recommend the workshop to other science teachers at his school, Hurwitz said, "Definitely," and then added with a

wink, "except, I wouldn't want them to come because I want to be the guy that gets to teach all this stuff!"

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